

Vol II Issue IX

ISSN No : 2230-7850

Monthly Multidiciplinary
Research Journal

Indian Streams Research Journal

Executive Editor

Ashok Yakkaldevi

Editor-in-chief

H.N.Jagtap

Welcome to ISRJ

RNI MAHMUL/2011/38595

ISSN No.2230-7850

Indian Streams Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial Board readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

International Advisory Board

Flávio de São Pedro Filho Federal University of Rondonia, Brazil	Mohammad Hailat Dept. of Mathmatical Sciences, University of South Carolina Aiken, Aiken SC 29801	Hasan Baktir English Language and Literature Department, Kayseri
Kamani Perera Regional Centre For Strategic Studies, Sri Lanka	Abdullah Sabbagh Engineering Studies, Sydney	Ghayoor Abbas Chotana Department of Chemistry, Lahore University of Management Sciences [PK]
Janaki Sinnasamy Librarian, University of Malaya [Malaysia]	Catalina Neculai University of Coventry, UK	Anna Maria Constantinovici AL. I. Cuza University, Romania
Romona Mihaila Spiru Haret University, Romania	Ecaterina Patrascu Spiru Haret University, Bucharest	Horia Patrascu Spiru Haret University, Bucharest, Romania
Delia Serbescu Spiru Haret University, Bucharest, Romania	Loredana Bosca Spiru Haret University, Romania	Ilie Pintea, Spiru Haret University, Romania
Anurag Misra DBS College, Kanpur	Fabricio Moraes de Almeida Federal University of Rondonia, Brazil	Xiaohua Yang PhD, USA
Titus Pop	George - Calin SERITAN Postdoctoral Researcher	Nawab Ali Khan College of Business Administration

Editorial Board

Pratap Vyamktrao Naikwade ASP College Devrukh,Ratnagiri,MS India	Iresh Swami Ex - VC. Solapur University, Solapur	Rajendra Shendge Director, B.C.U.D. Solapur University, Solapur
R. R. Patil Head Geology Department Solapur University, Solapur	N.S. Dhaygude Ex. Prin. Dayanand College, Solapur	R. R. Yalikal Director Managment Institute, Solapur
Rama Bhosale Prin. and Jt. Director Higher Education, Panvel	Narendra Kadu Jt. Director Higher Education, Pune	Umesh Rajderkar Head Humanities & Social Science YCMOU, Nashik
Salve R. N. Department of Sociology, Shivaji University, Kolhapur	K. M. Bhandarkar Praful Patel College of Education, Gondia	S. R. Pandya Head Education Dept. Mumbai University, Mumbai
Govind P. Shinde Bharati Vidyapeeth School of Distance Education Center, Navi Mumbai	Sonal Singh Vikram University, Ujjain	Alka Darshan Shrivastava Shaskiya Snatkottar Mahavidyalaya, Dhar
Chakane Sanjay Dnyaneshwar Arts, Science & Commerce College, Indapur, Pune	G. P. Patankar S. D. M. Degree College, Honavar, Karnataka	Rahul Shriram Sudke Devi Ahilya Vishwavidyalaya, Indore
Awadhesh Kumar Shirotriya Secretary, Play India Play (Trust),Meerut	Maj. S. Bakhtiar Choudhary Director,Hyderabad AP India.	S.KANNAN Ph.D , Annamalai University,TN
	S.Parvathi Devi Ph.D.-University of Allahabad	Satish Kumar Kalhotra
	Sonal Singh	

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.isrj.net



Application Of Remote Sensing And Gis In Coastal Zone Management: A Case Study Of Sundarban, West Bengal

Arindam Chattopadhyay

Department Of Geography, Sripat Singh College, Murshidabad

Abstract:

The Sundarban mangrove forest, one of the largest such forests in the world (140,000 ha), lies on the delta of the Ganges, Brahmaputra and Meghna rivers on the Bay of Bengal. It is adjacent to the border of India's Sundarban World Heritage site inscribed in 1987. The site is intersected by a complex network of tidal waterways, mudflats and small islands of salt-tolerant mangrove forests, and presents an excellent example of ongoing ecological processes. The area is known for its wide range of fauna, including 260 bird species. During each monsoon season almost all the Bengal Delta is submerged, much of it for half a year. The sediment of the lower delta plain is primarily advected inland by monsoonal coastal setup and cyclonic events. One of the greatest challenges people living on the Ganges Delta may face in coming years is the threat of rising sea levels caused mostly by subsidence in the region and partly by climate change. Present paper attempts to find out the problems of Sundarban Delta and mitigation measures with the help of Satellite data.

KEYWORD:

Remote Sencing, Management, Coastal Zone.

INTRODUCTION

The coastal zone of world is under increasing stress due to development of industries, trade and commerce, tourism and resultant human population growth and migration, and deteriorating water quality. This region is of very high biological productivity and thus an important component of the global life system. Coastal ecosystems harbour wealth of species and genetic diversity, store and cycle nutrients, filter pollutants and help to protect shorelines from erosion and storms. Marine ecosystems play a vital role in regulating climate and they are a major carbon sink and oxygen source. The industrial development of coast has resulted in degradation of coastal ecosystems and diminishing the living resources of Exclusive Economic Zone (EEZ) in form of coastal and marine-biodiversity and productivity. More than half population lives within 60 km of the coast.

In order to ensure sustainable development, it necessary to develop accurate, up-to-date and comprehensive scientific databases on habitats, protected areas, water quality,

environmental indicators and carry out periodic assessment of the health of the system. The modern scientific tools of remote sensing, GIS and GPS are extremely valuable in development of databases and to analyse them in the integrated manner and derive

management action plans. Availability of repetitive, synoptic and multi-spectral data from various satellite platforms, viz. IRS, LANDSAT, SPOT, have helped to generate information on varied aspects of the coastal and marine environment. Ocean colour data from OCANSAT I OCM, SeaWiFS, MODIS, provide information on biological aspects useful for fisheries and coastal ecosystems. In India, satellite based information has been used for generating inventory on coastal habitats, landforms, coastal land use and shoreline condition, condition assessment of protected areas, exploration of marine fisheries, mitigation of coastal disasters and understanding of sediment dynamics. GIS has been used for the

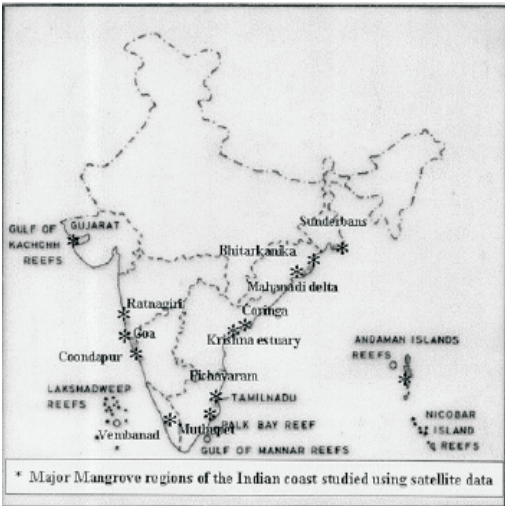
Please cite this Article as :Arindam Chattopadhyay ,Application Of Remote Sensing And Gis In Coastal Zone Management: A Case Study Of Sundarban, West Bengal : Indian Streams Research Journal (Oct. ; 2012)

integrating satellite based information for identifying aquaculture sites, coastal regulation and environmentally sensitive zones.

LOCATION OF THE STUDY AREA

Sundarban is situated on the lower end of the Gangetic West Bengal, 22.00° N – 89.00° E, at an altitude 0-10 m above sea level and just south of Kolkata. Sundarban covers an area of 4262 sq. kms where 70 percent is under saline water.

Location of Sundarban in India



SPOT Satellite Image



LANDSAT 7 IMAGE RELEASED BY NASA EARTH OBSERVATORY

DATA SOURCE

This work is based on secondary data obtained from Government and Non-Government office, NATMO Office etc. Relevant images have been collected in support of the facts stated in the literature. Various maps have been collected in order to fulfill the objective of the research.

ISSUES FOR COASTAL ZONE MANAGEMENT

The following issues are critical in context of coastal zone Management:

Coastal ecosystems and marine living resources

- i) Generation of reference or baseline data, conservation and restoration of vital and critical habitats such as mangroves, coral reefs, sea-grass beds, etc.
- ii) Reclamation of wetland for agricultural and industrial purposes
- iii) Exploration and sustainable use of living resources.

Shoreline protection

- i) Identification of vulnerable areas including eroded areas and developmental activities.
- ii) Planning and implementation of coastal protection work (erosion, flood protection, salt water intrusion, etc.)
- iii) Impact of engineering structures and dams on coastal processes of erosion, deposition and sediment transport.
- iv) Suspended sediment dynamics.
- v) Changes in bottom topography.

Coastal Hazards and Climate Change

- i) Cyclones, storm surges, sea-level rise and possible effect
- ii) Emergency response plans for natural disasters such as cyclones, sea level rise, or anthropogenic activities such as oil spills.

Coastal development

- i) Appropriate site selection for industries, landfill points, aquaculture, recreational activities, etc.
- ii) Assessment of conditions in regulation zones, areas under construction setback-lines, megacities, etc.

USE OF REMOTE SENSING DATA IN THE MANAGEMENT OF COSTAL ZONE

The accuracy of the study and mapping of costal zone depends on the type of data used. It is necessary to take into account the following characteristics of the remote sensing data before mapping has been undertaken. The characteristics are (a) Area (b) Spatial Resolution (c) Spectral Resolution (d) Spatial Change etc. Coastal classification systems have been designed on the criteria (Nayak, et al, 1991) of (a) Accuracy which should be 85 % at 90 % confidence level (b) Repeatability (c) Applicability (d) Suitability and (e) Flexibility. Variety of satellite data such as IRS-I, II, III and PAN, Landsat MSS and TM, SPOT HRV are available. False Colour Colour (FCC) made using green (0.52-0.59), red (0.62 – 0.69 mm) and Infrared (0.77-0.86 mm) were used to enhance land water boundary delineation and vegetation characteristics.

REMOTE SENSING APPLICATIONS IN STUDY OF COASTAL HABITATS OF SUNDARBAN DELTA

Knowledge about the extent and condition of coral reef is useful in planning conservation and preventing measures to protect this fragile ecosystem. Coral reef features such as type (Fringing, Atoll etc). Reef flat, reef vegetation, degraded reef, Lagoons, live corals and coralline shelf and have been mapped using IRS LISS-II and III data on 1:50000 scale for the Indian reef. These maps can be used as a basic input for identifying the boundaries of protected areas and biosphere reserves. Mangroves are very important as they help in the production of detritus, organic matter, recycling of nutrients and thus enrich the coastal waters and support benthic population of sea. They support the most fundamental need of coastal people the food, fuel, shelter. At many places Mangroves are degraded and destroyed due to conversion of these areas for agriculture and aquaculture and industrial purposes. Major community zonation o Mangrove has been carried out using a combination of red, near infrared and middle infrared bands of IRS-IC LISS-III data. Spectral signatures of the major homogeneous as well as heterogeneous communities of Mangroves have been established.

REMOTE SENSING APPLICATIONS IN STUDY OF COASTAL HAZARDS OF SUNDARBAN DELTA

The coastal zone is subject to various cyclic and random natural process and extreme events both natural and man made, which continuously modify the region. Protection of human life property and natural ecosystem. From various hazards is a major concern. The major hazards are cyclone and associated tidal floods, coastal erosions, pollution and sea level rise and its impacts. INSAT data has been regularly utilized to monitor the track of cyclones and forecasting its crossing point on land. IRS IC, ID data have been utilized to assess the damage caused by cyclone.

CONCLUSION

The physical development processes along the coast are influenced by a multitude of factors, comprising wave motions, micro and macro-tidal cycles and long shore currents typical to the coastal tract. The shore currents vary greatly along with the monsoon. These are also affected by cyclonic action. Erosion and accretion through these forces maintains varying levels, as yet not properly measured, of physiographic change whilst the mangrove vegetation itself provides a remarkable stability to the entire system. During each monsoon season almost all the Bengal Delta is submerged, much of it for half a year. The sediment of the lower delta plain is primarily advected inland by monsoonal coastal setup and cyclonic events. One of the greatest challenges people living on the Ganges Delta may face in coming years is the threat of rising sea levels caused mostly by subsidence in the region and partly by climate change. So change detection study is necessary to reduce the adverse effect of environment and it is only possible with the help of data provided by the Satellites.

REFERENCES

- Bagchi.K. (1944): The Ganges Delta. Calcutta University, Calcutta.
Basu S.R. and Ghose, R.B (2004): Contemporaries Environmental Issues of Bengal Basin, ACB Publications, Kolkata.
Chatterjee S.P. (1974): The Partition of Bengal Geographical Society of India, Department of Geography University of Calcutta, Calcutta.
Govt of West Bengal (2004): Human Development Report, Development and Planning Department, Government of West Bengal.

Publish Research Article International Level Multidisciplinary Research Journal For All Subjects

Dear Sir/Mam,

We invite unpublished research paper.Summary of Research Project,Theses,Books and Books Review of publication,you will be pleased to know that our journals are

Associated and Indexed,India

- ✍ International Scientific Journal Consortium Scientific
- ✍ OPEN J-GATE

Associated and Indexed,USA

- ✍ Google Scholar
- ✍ EBSCO
- ✍ DOAJ
- ✍ Index Copernicus
- ✍ Publication Index
- ✍ Academic Journal Database
- ✍ Contemporary Research Index
- ✍ Academic Paper Databse
- ✍ Digital Journals Database
- ✍ Current Index to Scholarly Journals
- ✍ Elite Scientific Journal Archive
- ✍ Directory Of Academic Resources
- ✍ Scholar Journal Index
- ✍ Recent Science Index
- ✍ Scientific Resources Database

Indian Streams Research Journal
258/34 Raviwar Peth Solapur-413005,Maharashtra
Contact-9595359435
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com
Website : www.isrj.net